

Results: Administration of TNBS produced distal colitis with a 7-fold elevation in MPO, hypophagia and weight loss. At 5 days body weight of the colitis group was 73% of healthy controls ($P<0.001$). Weight was similar in colitic and PF groups. There was a 45% reduction in bone formation (osteocalcin), 51% increase in bone resorption (PYD) and a 13% reduction in BMD in the colitic group. Values were similar to those in PF rats. See table.

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	Controls	Colitis	Pair-fed
Osteocalcin (ng/ml)	60.9±16.1	33.3±5.9*	41.0±7.0
PYD (mmol/L)	1.6±0.4	2.5±0.7**	2.2±0.7
BMD (mg/unit vol)	789±28	687±66†	730±48

* $P=0.002$; ** $P=0.0005$; † $P=0.02$ vs controls.

Conclusions: There are early and marked changes in bone formation and BMD in intestinal inflammation. Undernutrition is the major determinant. The inflammatory process itself, although severe, does not play a significant role.

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299 CO-EXISTENT FUNCTIONAL DYSPESIA (FD) IN PATIENTS WITH IRRITABLE BOWEL SYNDROME (IBS) WORSENS EXTRA-INTESTINAL SYMPTOMATOLOGY AND QUALITY OF LIFE

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Extra-intestinal (EI) symptomatology and poor quality of life (QOL) are frequently reported by patients with functional gastrointestinal disorders (FGID), such as IBS and FD^{1,2}. Given that these two conditions often co-exist, it was the aim of this study to assess (i) the frequency of occurrence of FD in patients presenting with IBS and vice versa; (ii) EI symptomatology and QOL in these sub-groups; and (iii) the relationship between FGID symptom severity, EI symptomatology and QOL. A questionnaire addressing FD, IBS (Rome II) and EI symptomatology, and QOL (visual analogue scales) was therefore completed by 80 patients presenting at the out-patients clinic with IBS (20–77 yrs; 64 female) and 77 patients presenting with FD (18–74 yrs; 46 female).

Results: 52 (65%) of patients with IBS had co-existent FD (IBS_{FD}), whilst 45 (58%) of patients with FD had co-existent IBS (FD_{IBS}). Patients with IBS_{FD} reported a greater number of EI symptoms [20(19,22); mean (95% CI) out of possible total of 31] than patients with FD_{IBS} [17 (15,19); $p=0.06$], IBS only [13(10,16); $p<0.001$] or FD only [17(14,19); $p=0.08$]. In addition, patients with IBS_{FD} had a poorer QOL [28.4(25.5, 31.2)] than those with FD [35.2(31.9,38.4); $p=0.02$] but not compared with those with FD_{IBS} [32.4(29.3,35.6)] or IBS only [33.4(30.2,36.5)]. Interestingly, poor QOL correlated with the number of EI symptoms reported in all patient sub-groups [IBS_{FD} $r=-0.562$, FD_{IBS} $r=-0.582$, IBS $r=-0.568$, FD $r=-0.469$; $p<0.01$]. Furthermore, FGID symptom severity correlated with both the number of EI symptoms and poor QOL in patients with IBS_{FD} [$r=0.573$, $p<0.001$; $r=-0.333$, $p=0.017$, respectively], FD_{IBS} [$r=0.309$, $p=0.039$; $r=-0.352$, $p=0.019$] and IBS [$r=0.392$, $p=0.035$; $r=-0.335$, $p=0.08$] but not those with FD [$r=0.095$, $p=0.6$; $r=-0.018$, $p=0.9$].

Conclusions: IBS patients with co-existent FD have more extra-intestinal symptomatology and poorer quality of life than patients with IBS only or FD patients with and without co-existent IBS. The occurrence of co-existent FGIDs and extra-intestinal symptomatology could influence treatment choice and outcome.

¹Gut 1986; 27: 37–40, ²Gut 1998; 42: 414–20.

300 USE OF OVER THE COUNTER MEDICATIONS AND ALTERNATIVE THERAPIES IN COMMUNITY BASED IBS "VOLUNTEERS"

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Introduction: Although the majority of irritable bowel syndrome (IBS) patients are managed in primary care, relatively little is known about the natural history of this condition especially treatment efficacy and the use of non-prescription medications and alternative therapies.

Aim: To gather prospective data about the natural history of IBS in a community based group of 'healthy volunteers' and to examine their utilization of over the counter (OTC) medications and alternative therapies.

Method: Five hundred and three volunteers (419 females, median 42.1 years) with a confirmed diagnosis of IBS using Rome II criteria were recruited and assessed as previously described*. A majority of IBS volunteers had consulted a hospital specialist at some stage ($n=318$, 69%). One hundred and thirty-eight (27%) volunteers had consulted their General Practitioner (GP) within 4 weeks and 346 (69%) were taking prescribed medication. OTC preparations were being taken in nearly one third of IBS (see table 12). Alternative therapies were employed by 15 % of patients (hypnotherapy, homeopathy, aromatherapy) and 140 volunteers employed relaxation therapies to counter their symptoms. Dietary adjustments had been made by 80% of the study group.

Conclusion: Despite the high demand the management of IBS places upon health service resources in both primary and secondary care settings many IBS patients self-medicate on a regular basis and utilise alternative therapies to treat their symptoms.

Abstract 300 Prescribed vs. OTC medications in IBS "healthy volunteers"

Drug taken	Prescribed (n = 346)	OTC (n=146)
Anti-spasmodics	135	24
Alter gut motility	62	35
Anti-diarrhoeal agents	50	26
Bulk laxatives	52	12
Aloe vera	0	9
Herbal remedies	0	22
Others	47	18

Financial support for this study was given by Glaxo Smith Kline. *Smith, G.D & Penman, I.D, *Gut* (2001); 48 (suppl II): A45.

301 IS LACTOSE INTOLERANCE IMPLICATED IN THE DEVELOPMENT OF POST INFECTIOUS BOWEL SYMPTOMS IN PREVIOUSLY ASYMPTOMATIC PEOPLE?

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Introduction: Studies looking at lactose intolerance in post-infectious IBS subjects are scanty and the relationship between lactose intolerance and post-infectious IBS is still debated.

Aims: We wished to see if lactose intolerance was evident in a cohort of subjects with a recent diagnosis of stool culture positive gastro-enteritis.

Methods: 42 subjects with recent enteric infection underwent the combined lactose tolerance test 3 to 6 months after their gastro-enteritis. To reduce false positive and negative results, subjects had fasted, refrained from smoking on the day and denied recent antibiotic use. Using the self-complete Rome II modular questionnaire, 24 were diagnosed with post-infectious IBS (16) or functional diarrhoea (8) and 18 were not (controls). Lactose intolerance was diagnosed by a test of absorption (lactose tolerance test) and malabsorption (lactose breath hydrogen test) according to accepted protocol. An increase in plasma glucose by less than 1.1mmol/L together with a rise in the breath hydrogen value over 20ppm from baseline together with the development of symptoms is considered diagnostic of lactose intolerance.

Results: In the subjects who had developed functional diarrhoea or IBS, none had evidence of lactose intolerance. Although there were four tests where the plasma glucose failed to increase by more than 1.1mmol/L, the breath test was not confirmatory and all the subjects were asymptomatic post test. In the control subjects, there was only one positive combined test. Since this was in a subject who was currently asymptomatic, lactose intolerance cannot be said to be present. In addition, there were six other subjects in the asymptomatic group where the plasma glucose failed to increase by more than 1.1mmol/L but the breath test was not confirmatory and again, no subject complained of symptoms post test.

Conclusions: Infectious diarrhoea does not cause persistent lactose intolerance. Lactose intolerance does not appear to be implicated in the aetiology of post-infectious IBS or functional diarrhoea. Advice to avoid dairy products in patients presenting with post-infectious bowel symptoms on the basis they may have lactose intolerance is unfounded.

302 5-HYDROXYTRYPTAMINE (5-HT) CONCENTRATIONS IN THE GASTROINTESTINAL TRACT OF FED AND STARVED RATS

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Introduction: There is evidence to suggest that the differing clinical presentation and response to therapy of men and women with functional gastrointestinal disorders may be related to differences in the processing of 5-HT. There is also evidence that 5-HT levels increase in the circulation following a meal in irritable bowel syndrome patients and that this may be related to postprandial increase in symptoms. We therefore assessed tissue 5-HT levels in the gastrointestinal tract (GIT) in fed and starved rats.

Methods: Male and female Wistar rats were fed standard rat chow or starved for 24h (200g, total n=24, six in each group). The rats were sacrificed by cervical dislocation and the GITs dissected out and frozen in sections immediately in liquid N₂. The GITs were divided into stomach, duodenum, small bowel, proximal and distal colon. Frozen segments were weighed and fragmented using a mortar and pestle and a weighed portion placed in 1ml of 10%v/v perchloric acid (PCA). PCA samples were homogenised using an ultraturax and spun at 13,000rpm for 15min. The resulting supernatant was analysed by HPLC with fluorimetric detection. The results were expressed as concentration of 5-HT in each segment by pmol/mg dry weight (dw). The remaining tissue was placed in a drying oven for 18 h to determine wet weight /dry weight ratio. Data was assessed using Mann Whitey (StatsDirect programme; significance level p≤0.05).

Results: No differences were detected between male and female 5-HT concentrations in the GIT but fed rats had significantly less 5-HT in the stomach than starved rats (mean 78.7 pmol/mgdw (lower 95% CL 65.4:upper 95%CL 92.1) vs mean 142.9 pmol/mgdw (lower 95% CL 96.22:upper 95% CL 189.0) p=0.02). Fed male rats had significantly less 5-HT in the stomach than starved males (mean 80.1 pmol/mgdw (CL 60.3:99.8) vs 156.2 (CL 83.1:229.0) p=0.041).

Conclusion: Quantitative differences detected between 5-HT in the stomach of fed and starved rats may be involved in the effect of feeding on postprandial symptoms in functional gastrointestinal disorders.

303 SMOOTH MUSCLE CELL CHOLINERGIC DENERVATION HYPERSENSITIVITY IN HUMAN SIGMOID DIVERTICULAR DISEASE

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Background: Abnormalities in colonic wall support tissue, in particular smooth muscle, may be responsible for diverticular disease (DD). We have used a new indirect immunohistochemical (IHC) technique for quantifying cholinergic activity, together with IHC quantification of type 3 smooth muscle muscarinic (M3) receptors and in-vitro pharmacological experiments, to examine smooth muscle cholinergic activity in DD.

Methods: IHC/ image-analysis quantification of Choline Acetyl Transferase (ChAT), co-localised with Protein Gene Product (PGP: a marker of total neural tissue) and smooth muscle M3 receptors, was performed on multiple histological sections of sigmoid colons from eight patients (4 DD, 4 controls) following anterior resections for rectal tumours. Isotonic organ bath experiments were used to examine muscle sensitivities to exogenous acetyl choline.

Results: Circular muscle in DD showed a reduction in ChAT activity (DD: range 10–100%, median 45. Controls: 45–100%, median 95)*, an up-regulation of M3 receptors (DD: 5–27, median 16. Controls: 1–5, median 3)** and increased sensitivity to exogenous acetyl choline (DD: EC50 range 0.15–12µmol, median 4.0. Controls: 0.4–55, median 17)***. Longitudinal muscle showed a reduction in ChAT activity (DD: range 2–90, median 45. Controls: 30–100%, median 95), an up-regulation of M3 receptors (DD: 2–32, median 10. Controls: 1–5, median 2) and increased sensitivity to exogenous acetyl choline (DD: EC50 range 0.3–9.5µmol, median 4.0. Controls: 0.5–100, median 10). All p values <0.02.

Conclusions: Our results show cholinergic denervation hypersensitivity in DD, a recognised phenomenon in skeletal muscle, but one not previously reported in association with smooth muscle.

*Percentage of total PGP surface area. ** Percentage surface area.

*** EC 50: Effective concentration at 50% maximum response.

304 ACUPUNCTURE FOR IRRITABLE BOWEL SYNDROME: A BLINDED PLACEBO-CONTROLLED TRIAL

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Irritable bowel syndrome is common and many patients currently fail to find adequate relief from their symptoms. It is claimed that acupuncture is effective for a majority of these patients but there are few data to support this.

Sixty patients with well-established irritable bowel syndrome were recruited to a controlled trial of traditional Chinese acupuncture. The blinded comparator was sham acupuncture administered by the second of 2 therapists who alone was aware of the randomisation, and who otherwise followed the prescription of the first. The primary end-point was a defined fall in the symptom score at 13 weeks (by intention to treat). The prior expectation was a 30% placebo response, and a response rate of about 70% from acupuncture, for which the study was adequately powered.

Patients in treated and sham groups improved significantly during the study - mean improvement in scores being equal (minus 1.9) and significant for both (p<0.05; 1-tailed t test). There was a small numeric but non-significant difference between the response rate in patients receiving acupuncture (40.7%) and sham treatment (31.2%). Some of the secondary end-points marginally favoured active treatment, but an improved symptom score of any degree of magnitude occurred more often with sham therapy (65.6% v 59.2%). For no criterion was statistical significance approached.

Traditional Chinese acupuncture is relatively ineffective in irritable bowel syndrome, and the magnitude of any effect appears insufficient to warrant investment in acupuncture services for this group of patients.

305 COMMUNITY BASED "VOLUNTEERS" WITH IRRITABLE BOWEL SYNDROME: SYMPTOM PATTERNS, HEALTH RELATED QUALITY OF LIFE AND USE OF HEALTH CARE RESOURCES

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Introduction: Irritable bowel syndrome (IBS) has a substantial impact upon patients' quality of life and medical resources among those attending hospital clinics.

Aim: To examine the symptom patterns, health related quality of life and use of health care resources in a group of community based 'healthy volunteers' with IBS.

Patients and Methods: Five hundred and three volunteers (419 females, median 42.1 years) with a confirmed diagnosis of IBS using Rome II criteria were recruited via a national newspaper advertising campaign as previously described*. Abdominal pain / discomfort was reported to be the predominant symptom in 62 % of volunteers, whereas 31 % reported altered bowel habit as most bothersome. Health related quality of life was measured with EuroQoL EQ-5D questionnaire.

Results: A majority of volunteers reported a history of IBS symptoms for over a year, with more than half reporting symptoms for more than five years. A half of all volunteers (n= 254) had received their diagnosis from their General Practitioner (GP) and 138 (27%) had consulted their GP within the previous month. 318 (63%) had attended a hospital specialist at some stage. Most commonly prescribed drugs for this group were anti-spasmodics (38 %), and

drugs to alter gut motility (18 %), bulk laxatives (16 %), anti-diarrhoeal agents (13 %) and analgesics (9 %) were also commonly prescribed. Half volunteers were in full time employment (51%), of whom three-quarters reported difficulty at work related to their IBS. Baseline EQ-5D scores indicated a poor mean state of health 68.5 for IBS sufferers (Mean normal population score 82.5). Volunteers also reported high levels of morbidity in the pain / discomfort and anxiety / depression dimensions of health.

Conclusion: Otherwise well, community based 'volunteers' with IBS have significantly impaired HRQoL and utilisation of healthcare resources including GP consultation, specialist referral and use of medications.

*Smith, G.D & Penman, I.D, *Gut* (2001); **48** (suppl II): A45.
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306 POSTPRANDIAL SMALL BOWEL MOTILITY IN IRRITABLE BOWEL SYNDROME (IBS) PATIENTS AND HEALTHY CONTROLS IN RESPONSE TO ISOCALORIC MEALS

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Background: IBS patients frequently report postprandial worsening of symptoms suggesting that small bowel motility may be abnormal in this period. The aim of this study was to compare postprandial small bowel motor activity between IBS patients and healthy controls.

Method: Ambulatory small bowel manometry was performed in 19 IBS patients {(2M/17F); 10 constipation-predominant (C-IBS); 9 diarrhoea-predominant (D-IBS)} and 4 healthy controls (0M/4F). Each subject ingested 3 isocaloric test meals (fat, protein and carbohydrate rich) in a random order. Automated data analysis was performed using a validated software programme. Postprandial activity was analysed for Motility Index (MI), contractile frequency (freq) and median amplitude in one-hour epochs.

Results: D-IBS group had significantly higher MI ($p<0.001$), freq ($p<0.001$) and amplitude ($p<0.001$) compared to C-IBS group in the first hour. The difference in MI and amplitude were significant throughout the postprandial period, but freq difference was not significant after the first hour. C-IBS group had significantly lower MI ($p<0.001$), amplitude ($p<0.001$) and freq ($p=0.002$) compared to controls. These differences were significant throughout the postprandial period except in the third hour where the difference in amplitude was not significant. D-IBS group had significantly lower MI ($p=0.038$) and freq ($p<0.001$) compared to controls. These differences were significant throughout the postprandial period. The amplitude steadily increased during the postprandial period and was significantly higher in the D-IBS group as compared to controls in the third ($p=0.006$) and fourth ($p=0.008$) hour but only reached borderline significance in the first ($p=0.162$) and second ($p=0.082$) hours.

Conclusion: In C-IBS patients, the MI, amplitude and freq were consistently lower in the postprandial period as compared to the healthy controls and D-IBS patients. This may result in the reduced bowel frequency observed in these patients. The D-IBS patients had reduced postprandial freq and MI but higher amplitude compared to healthy controls. This may help to explain the increased frequency and loose stools observed in these patients.

307 THE EFFECT OF PROTEIN, CARBOHYDRATE AND FAT RICH ISOCALORIC MEALS ON POSTPRANDIAL SMALL BOWEL MOTILITY IN IRRITABLE BOWEL SYNDROME (IBS) PATIENTS

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Introduction: Whilst abnormalities in fasting small bowel motility in IBS patients have been well characterized, little is known about the fed response in these patients.

Aim: To study the motor response to isocaloric fat, protein and carbohydrate rich meals in IBS patients and healthy controls.

Methods: 19 IBS patients {(2M/17F) 10 constipation predominant (C-IBS), 9 diarrhoea predominant (D-IBS)} and 4 healthy controls (0M/4F) were studied. Ambulant small bowel motility was measured using a solid-state flexible catheter positioned in the proximal jejunum. Each subject ingested the three isocaloric test meals (high fat, protein and carbohydrate) in a random order. Automated data analysis was performed using a validated software programme. The postprandial motility index (MI) and contractile frequency (freq) were calculated for two 60-minute epochs.

Results: In C-IBS, the MI and freq in response to a fat rich meal were significantly greater than to either protein ($p=0.006$, $p=0.003$) or carbohydrate ($p=0.001$ $p=0.005$) rich meals in the first hour but not in the second hour. In D-IBS, MI and freq were significantly higher for a fat rich meal compared to a protein rich meal ($p=0.009$ $p=0.002$) during the first hour and to a carbohydrate rich meal ($p=0.027$ $p=0.048$) in the second hour. In healthy controls, there was no significant difference in the MI and freq in the first hour between the three meals, however during the second hour, the MI and freq were significantly lower in response to a fat rich meal as compared to protein ($p=0.003$ $p=0.001$) and carbohydrate ($p=0.003$ $p<0.001$) rich meals.

Conclusion: This study shows that postprandial motor activity in IBS patients is different from healthy individuals. In keeping with the effect of a fat rich meal on gastric motility, healthy individuals respond to a fat rich meal with reduced MI and freq as compared to carbohydrate and protein rich meals. The IBS patients show an increased postprandial MI and freq in response to a fat rich meal as compared to carbohydrate and protein rich meals. These opposing effects suggest that food handling by small bowel is abnormal in IBS patients.

308 EFFECTS OF CALCIUM POLYCARBOPHIL ON COLONIC TRANSIT IN PATIENTS WITH IRRITABLE BOWEL SYNDROME

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Background: Calcium polycarbophil is useful for improving abdominal symptoms in patients with irritable bowel syndrome (IBS). However, the effects of calcium polycarbophil on colonic transit have not been characterized.

Aim: To investigate colonic transit before and after administration of calcium polycarbophil in IBS patients.

Methods: A total of 22 IBS patients, 14 diarrhea type (9 women and 5 men) and 8 constipation type (8 women), were selected under the Rome II criteria: with a median age of 47 yr (range = 18 – 70 yr). Before administration of calcium polycarbophil, 3 sets of distinctive markers were ingested by IBS patients on 3 successive days. A single abdominal X-ray was taken on the 5th and 7th day. Mean colonic transits were calculated by the number of markers in the colon (Metcalf AM, Phillips SF, 1987). Bowel movements and the Bristol scale score were also measured. After oral administration of 3,000 mg/day of calcium polycarbophil for 6 weeks, transit times of radiopaque markers were measured again.

Results: *Diarrhea type:* Mean colonic transits were 3.2 ± 2.9 hr (Mean \pm SD) before administration of calcium polycarbophil, 10.4 ± 10.9 hr after administration ($p<0.05$). Bowel movements were 3.2 ± 0.9 times/day before, 1.4 ± 0.5 times/day after administration ($p<0.05$). The Bristol scale score was 4.2 ± 0.7 before, 3.8 ± 0.4 after administration ($p<0.05$). *Constipation type:* Mean colonic transits were 48.8 ± 32.8 hr (Mean \pm SD) before administration of calcium polycarbophil, 35.4 ± 37.8 hr after administration. Bowel movements were 2.1 ± 0.4 times/week before, 4.0 ± 1.9 times/week after administration ($p<0.05$). The Bristol scale score was 1.9 ± 0.4 before, 3.3 ± 0.7 after administration ($p<0.05$).

Conclusion: Calcium polycarbophil is useful in improving colonic transit in diarrhea and trends to accelerate colonic transit in constipation. Bowel movements and stool type were improved in both conditions.

309 ALOE VERA LIQUID MAY IMPROVE SYMPTOMS IN IBS RESISTANT TO CONVENTIONAL TREATMENTS

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Background: There are anecdotal reports of the efficacy of Aloe Vera in IBS.

Aims: To assess the effectiveness of a liquid formulation IBSCOL.

Subjects and Methods: We performed a double-blind placebo controlled randomised trial. Subjects were aged 18–65 and met the Rome 2 criteria for IBS. All had failed conventional treatments with antispasmodics or dietary manipulation. They were recruited from gastroenterology clinics at two hospitals. Treatment was with IBSCOL 50mls qds for 1 month. Subjects were interviewed at 0, 1 and 3 months. The IBS questionnaire of Whorwell (APT 1997) was used to detect change in symptoms. The primary endpoint was a response to

treatment defined as greater than 50 point fall in the IBS score (0–500 scale). Secondary endpoints were improvements in individual symptoms (pain, distension, bowel habit and interference with lifestyle).

Results: 26 subjects were randomised into placebo and 32 into active treatment. 4 subjects in the placebo group and 2 in the active group failed to complete the study medication, the main reason being nausea reported by 3/26(12%) of the placebo group and 1/32(3%) of the active group respectively. 22/27(82%) and 27/32(84%) respectively of subjects were followed to 1 month and 16/27(60%) and 25/32(78%) for 3 months. 72% and 91% had diarrhoea predominant or mixed IBS. 10/22(45%) in the placebo and 18/27(67%) in the active group showed a response to treatment at 1 month ($p=0.13$). There was no difference by 3 months. There was significant improvement in pain score at 3 months ($p=0.05$). In the diarrhoea and mixed bowel habit sub-group, there was trend towards an improvement in IBS score at 1 month, 44% v 67% improving ($p=0.15$), a significant improvement in the proportion of subjects with any pain in the past week $p=0.046$, a trend towards an improvement in the % of days without pain in the past week ($p=0.06$), and in satisfaction with bowel habit $p=0.06$. By 3 months these changes had disappeared.

Conclusion: In this study of resistant IBS, there was some evidence of efficacy for the IBSCOL formulation of Aloe Vera that was well tolerated. These findings require replication in a larger, and milder group of patients.

310 DOES ILLNESS PERCEPTION OF BACTERIAL GASTRO-ENTERITIS DIFFER IN PEOPLE WITH A FUNCTIONAL GASTRO-INTESTINAL DISORDER (FGID) AND CAN IT PREDICT WHO WILL GO ON TO DEVELOP A POST INFECTIOUS FGID?

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Background: IBS can develop after gastro-enteritis. Cognitive factors (such as illness representation) may be important influences on the development of post-infectious IBS but have not been extensively studied.

Aims: Do differences exist in illness perception in people with recent stool culture positive bacterial gastro-enteritis with and without a prior FGID and also in those who go on to develop a FGID compared with those who do not.

Methods: 217 people with recent bacterial gastro-enteritis completed a postal gastro-intestinal disease questionnaire (GIDQ) incorporating the Rome II modular questions relating to IBS, functional dyspepsia or functional diarrhoea asking about symptoms during the last year. The cases were divided into those with ($n=82$) and without a prior FGID ($n=122$). All cases then completed the Illness Perception Questionnaire (IPQ - Weinman et al.), which taps into 5 areas of illness perception: Causation, identity, timeline, consequences and control/cure. Those without a prior FGID were followed up and a similar GIDQ was completed at six months. 25 people subsequently developed a FGID and 82 did not.

Results: People with a prior FGID had significantly more symptoms (identity domain) and scored significantly higher on the timeline and consequence scores than those without. People who developed a FGID had higher consequence scores than those who did not and a non-significantly higher number of symptoms. Neither comparative group differed in the control/cure scores or causation scores.

Conclusions: People with recent bacterial gastro-enteritis and a prior FGID have more symptoms relating to their gastro-enteritis, think their illness will last longer and is more serious than those without a prior FGID. People who develop a post-infectious FGID tend to believe their gastro-enteritis is more serious than those who do not. We conclude therefore that having a FGID influences a person's perception of bacterial gastro-enteritis. However, illness perception is not a strong predictor for the subsequent development of a FGID.

311 GENDER DIFFERENCES AND EFFECTS OF AGE ON 5-HYDROXYTRYPTAMINE (5-HT) TURNOVER: IMPLICATIONS FOR IRRITABLE BOWEL SYNDROME (IBS)

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Irritable bowel syndrome (IBS) is more common in women than men¹, suggesting that they may have a predisposition to the condition. As recent studies have suggested that 5-HT may play a role in the aetiology of IBS², we investigated whether fasting platelet depleted plasma 5-HT and its metabolite, 5-hydroxyindole acetic acid (5-HIAA), and platelet 5-HT concentrations are different between healthy males ($n=22$; aged 21–63 yrs) and females ($n=22$; aged 22–63 yrs). The effect of increasing age on fasting 5-HT and 5-HIAA concentrations was also assessed. 5-HT and 5-HIAA concentrations were measured by a reverse-phase high performance liquid chromatography (HPLC) with fluorimetric detection.

Results: Healthy females had similar concentrations of both fasting platelet and plasma 5-HT (platelet: 603ng/10⁹ platelets(343,863)ng/10⁹ platelets, mean (95% CI); plasma: 5.60ng/ml (3.48,7.72)ng/ml) to males (platelet: 580ng/10⁹ platelets(260,840)ng/10⁹ platelets; plasma: 5.80ng/ml(3.40,8.40)ng/ml). However, females had significantly lower levels of plasma 5-HIAA (8.30ng/ml (4.98,11.62)ng/ml) than males (10.40ng/ml(4.90,15.90)ng/ml; $p=0.008$); resulting in a reduction of the ratio of 5-HIAA/5-HT, a measure of 5-HT turnover or metabolism (females: 1.50(1.06,1.94) v males: 1.84(0.94,2.74); $p=0.002$). In addition, increasing age correlated with increased turnover in females ($r=0.49$, $p=0.05$) but not in males ($r=0.301$, $p>0.05$); but it is of interest to note that the maximum 5-HT turnover in women (upper 95% CI = 1.94) still just reached the mean value (1.84) for male turnover.

Conclusion: Healthy females appear to have reduced turnover of 5-HT compared with males, which may play a role in their increased propensity to develop IBS. However, with increasing age, females appear to increase their ability to turnover 5-HT supporting the observation that changing the ovarian steroid hormone level may affect the 5-HT system³.

¹Drossman et al, *Gastroenterology* 1977;73:811–22, ²Bearcroft et al, *Gut* 1998; 42: 42–46, ³Bethea et al, *Molecular Neurobiology* 1998; 18: 87–123.

312 MODULATION OF THE HUMAN SWALLOWING MECHANISM BY THERMAL AND CHEMICAL STIMULATION IN HEALTH AND AFTER BRAIN INJURY

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Background/Aims: Swallowing is a complex neuromuscular activity dependent on sensory feedback. Following stroke, dysphagia is commonly treated by sensory stimulation techniques including thermal and chemical stimulation. However, little data support the use of such methods to favourably alter swallow physiology. Our aims were to explore the effects of thermal (cold) and chemical (citrus) alterations on the performance of water swallowing in health and in stroke patients.

Methods: Healthy volunteers ($n=65$, mean age 45 yrs, 25 male, 40 female) and acute (72hrs) stroke patients ($n=12$, mean age 61.3yrs, 4 male, 8 female) admitted to a stroke rehabilitation unit were studied. A bedside timed 50 ml water-swallowing test was performed in a randomised manner at a) room temperature (RT), b) cold (4°C) (CD), c) 5% citrus (CT) and d) combined cold and citrus (CD+CT). The time taken to swallow (speed), and the number of swallows (capacity) per volume were measured with each condition on 3 occasions. Comparisons between each condition were made with ANOVA.

Results: In health, whilst both CD and CT alone showed a trend towards altering the swallow, compared to RT water, only combined CD+CT slowed the speed (10.3 vs. 11.3 ml/s, $p<0.01$) and the capacity (14.6 vs. 16.4 ml/swallow, $p<0.01$) of swallowing. A sub-analysis, based on age showed that this effect was present both in the young (<60yrs) and old (>60yrs) alike. When applied to stroke, compared to RT, CD+CT slowed both the speed (5.0 vs. 6.1 ml/s, $p=0.06$) and capacity (9.7 vs. 11.1 ml/swallow, $p<0.05$) of swallowing.

Conclusions: Combining thermal and chemical sensory modalities to water boluses can substantially alter the pattern of normal swallowing in health and after stroke. The ability to slow and reduce the amount of volume taken per swallow may be advantageous in patients with dysphagia where inappropriately judged bolus intake is a factor in the development of aspiration.

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313 DOES IMPLEMENTATION OF ANTIBIOTIC PROPHYLAXIS IN PEG INSERTION AFFECT INCIDENCE OF WOUND INFECTION?

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Percutaneous gastrostomy (PEG) insertion is associated with a significant morbidity. Recent studies suggest that antibiotics given at the time of PEG insertion may reduce complications, in particular soft tissue infection. A previous audit of all PEGs from Feb 1998 to July 1999 performed in our unit revealed a high rate of PEG site infection, although most cases were not severe (14.2%). A policy of prophylactic antibiotics (Ampicillin 1g IV, Gentamicin 80mg IV) administered at the time of PEG insertion was instituted and complication rate was reaudited.

Methods: Retrospective case note review from Jan 2000 to April 2001.

Results: 79 PEGs performed, 51 (65%) notes were available for review. Mean age 70.8yrs (SD 15.3±, range 36–98), M:F =27:25. Indications for PEG: CVA/CNS disorders =27, pre-op ENT malignancy =12, nutrition support =12. In both audits patient characteristics were similar and differed only in antibiotic use. *Audit 1:* 4/42 (9%) concurrent antibiotics, 38/42 (91%) none given. *Audit 2:* 37/51 (73%) antibiotics given, 14/51 (27%) none. See table.

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	Audit 1 n=42 No antibiotic policy	Audit 2 n=51 Antibiotic policy	Fisher's exact test
Wound infection	6	3	0.29
C Difficile	0	3	0.25
28 day mortality	5	6	1.0
180 day mortality	17	19	0.83

Conclusions: On basis of this data, there was no statistically significant reduction wound sepsis, or mortality from the routine use of antibiotics at the time of PEG insertion. However, not all case notes were available and this reduced the number of subjects included in this audit. This reduction in numbers may mean that non-significance does not exclude a clinically important difference in PEG site, wound infection. Audit of complications following PEG insertion is continuing.

314 DO PATIENTS ON HOME GASTROSTOMY FEEDING NEED TO ATTEND ENDOSCOPY UNITS FOR MANAGEMENT OF MINOR COMPLICATIONS?

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Introduction: A growing number of patients are being discharged into the community with gastrostomy feeding tubes. Minor complications related to the tube are not uncommon in this group but availability of expert advice in the community is limited. As a result many patients contact the Endoscopy unit where the tube was inserted for help in managing minor complications.

Objectives: To identify the reasons that prompted review of patients with gastrostomy in the endoscopy unit. The advice given/action taken was also recorded to assess whether hospital attendance could be avoided if appropriate support care was available in the community.

Methods: Data was collected retrospectively over 2 years (01/99–12/00) of patients attending the endoscopy unit at UHA with PEG tube related problems.

Results: Seventy patients attended our endoscopy unit with problems relating to their gastrostomy tube. The mean age of these patients was 64.5 years (range 32–85 years). The reasons for attendance were: red/inflamed and sore areas around the PEG stoma site (35%), broken/missing attachment (14%), blocked tubes (14%),

leaking (12%), tube displacement (12%), hypergranulation (10%) and split tube (2%). The management of these problems included: trimming or attachment replacement (30%), cleaning and swabbing for infection around stoma sites (25%), advice regarding dressing (13%), change of PEG via endoscopy (15%) or without the aid of endoscopy (7%) and miscellaneous (10%). Eighty five percent of the presenting complaints could have been solved in the community by an appropriately trained staff.

Discussion: Our experience shows that more than three quarter of the problems could have been dealt in the home environment and would have required only one visit by the liaison nurse. This audit provides further evidence for the recommendation by the BAPEN that creating a suitable support system to continue treatment at home is desirable and would avoid unnecessary hospital attendance.

315 IMPROVED NUTRITIONAL RECOVERY ON AN ELEMENTAL DIET IN ZAMBIAN CHILDREN WITH PERSISTENT DIARRHOEA AND MALNUTRITION

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Introduction: The persistent diarrhoea-malnutrition syndrome (PDM) remains a leading cause of morbidity and mortality in many resource-poor countries, but even in hospitals treatment is unsatisfactory. We report a randomised controlled trial of an elemental diet compared to standard nutritional rehabilitation for PDM in the University Teaching Hospital, Lusaka.

Study design: 200 children (106 HIV seropositive, 90 HIV seronegative) were randomised to an elemental diet with Neocate (SHS International) or to a skimmed milk-based followed by soy-based diet. Treatment was given for 4 weeks in hospital, and intestinal and systemic infection treated with routine therapies.

Results: 155 children completed 4 weeks of therapy, 39 died and 6 were lost. They were severely malnourished with median baseline weight-for-age z scores around -4.0; 9% were underweight, 23% had marasmus, 47% had kwashiorkor, and 21% marasmic-kwashiorkor. Weight gain was greater in the Neocate group (median gain in weight-for-age z score 1.23, interquartile range 0.89–1.57) compared to Control (0.87, 0.47–1.25; p=0.002), despite greater calorie intakes in the Control group. Increase in haemoglobin concentration was also greater in the Neocate group (0.8g/dl, 0–1.8) than the Control group (0.3, -0.6–1.6; p=0.04). Diarrhoea frequency and global recovery scores improved equally in both treatment groups. Mortality was higher in HIV seropositive children and those with cryptosporidiosis, but did not differ between treatment groups.

Conclusions: Exclusive use of an elemental diet for 4 weeks was associated with significantly improved nutritional recovery in children with severe PDM, irrespective of HIV infection.

316 PERCUTANEOUS ENDOSCOPIC GASTROSTOMY: PROSPECTIVE CLINICIAN REVIEW APPROPRIATELY DECREASES INSERTION

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Aims: Percutaneous endoscopic gastrostomies (PEG) are an increasingly frequent method for providing nutritional support. We set out to assess current practice surrounding referrals for PEG insertion in a district general hospital and their outcomes.

Methods: All patients who were referred for PEG insertion over a six-month period were assessed. Data were prospectively collected for each referral with regards to; duration between dates of admission, referral and insertion of PEG; indications; appropriateness of referral; prior clinical assessment by dietician or speech therapists and ability of patient to give informed consent for the procedure. Six-month follow up of all patients referred was then performed by case record examination.

Results: 50 patients were referred for consideration of PEG insertion. 24% of patients were deemed inappropriate for PEG insertion. This was either because the patient was currently unfit/had a poor prognosis or was able to swallow or because it would be technically difficult. There was a 44% 30-day mortality rate in the PEG insertion group compared to a 50% 30-day mortality rate in the PEG not